1:1 Readiness Assessment Agenda

- Computers in Schools - Background
- Project Background, Goals & Approach
- Issues & Observations
- 1:1 Guiding Principles & Value Model
- Pilot School Selection Criteria & Tool
- Architecture/Technical Recommendations
- Deployment/Support/Recommendations
- Communication & Change Management Recommendations
- 1:1 Program Timelines
- Key Next Steps

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Affordable Classroom Computers For Every Secondary Student – Indiana Access

Characteristics of typical school-based computer initiatives

Several Approaches:

- Differing focus areas: Elementary; Middle; High School (usually middle school focused)
- Typical: Desktop computers in labs rather than in classrooms
- Typical: A few desktop computers in some classrooms
- Atypical: Banks of Computers on Wheels that are portable and move between classrooms
- Some experiments underway with laptop computers for every student in certain grades (usually middle schools or sometimes high schools, but not usually both)
- Some experiments underway with desktops for every student in some classrooms

Issues for school-based computer initiatives

Issues – Traditional computer lab / classroom model:

- Affordability: programs to equip all students are too expensive & not sustainable (e.g., GA; MI; ME)
- Computer usage time is typically only 35-40 min / week / student
- Lab scheduling issues & competition for lab time – only some classes on some days (same issue with computers on wheels)
- Disruption: students must move/travel to labs, consuming valuable learning time (herding students down the hall)
- Student data storage issues
- Poor student to computer ratios in situations where there are a few computers in a classroom
- Hardware & software is expensive; costly to maintain & replace
- Real impact on learning is questionable

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Issues for school-based computer initiatives

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Issues – Laptop for each student model:

- Most efforts under this model are experimental – few examples of sustained use / success beyond single schools

- Affordability: programs to equip all students are too expensive & not sustainable (e.g., Cobb County, GA high school initiative projected to cost more than $100 Million; Michigan, Maine)

- When deployed at middle school levels, students lose their computers when graduating to high school

- Replacement costs are high when computers reach end of life

- Financial risk of loss of or damage to computers

- Privacy/security/access management issues

Michigan's student laptop computer program at risk

Detroit Free Press
www.freep.com

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MIKE WENDLAND: School laptop project at risk

State urged to keep it, despite fiscal crisis

April 18, 2005

BY MIKE WENDLAND
FREE PRESS COLUMNIST

Michigan's grand vision of equipping every sixth-grade student in the state with a laptop computer may be no more.

Once hailed as one of the nation's most progressive and ambitious technology learning projects, even a scaled-down version of the program -- which educators describe as a huge success -- will be eliminated if Gov. Jennifer Granholm gets her way.

Linux & Open Source for Schools in the News

eGov monitor

Where can you find answers to your e-government issues…

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Open Source Makes School Breakthrough

By **eGov monitor Newsdesk**
Published Monday, 25 April, 2005 - 13:33

Forthcoming government report to pave way for greater OSS use in UK schools

Becta, the Government's lead agency for ICT in education, is set to release a new report which will say that schools could save significant sums by switching to open source software, eGov monitor can report.

The landmark report will show that OSS can be implemented successfully in schools and present documented examples of cost savings from its use.

Becta's report, based on a study of 15 schools, will state that open source office products have been demonstrated to offer schools a cost-effective alternative to proprietary software.

Among the key findings will be that primary and secondary schools using OSS substantially reduced the total cost of ownership per PC. Support costs - typically accounting for more than half a PC's total cost - showed the biggest reduction.

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Impact of Michigan's "Freedom to Learn" student computer initiative

"I've been an educator for 39 years," he said last week. "I have seen nothing like this technology to improve grades and improve motivation and improve discipline in the classroom," said Jim Bembenek of the Berrien County Intermediate School District in southwest Michigan

Bembenek's district put 2,400 wireless Hewlett-Packard laptops in sixth-graders' hands last fall. Under the program, they would be able to keep the computers as they move on to the seventh grade.

Greg Bird, a spokesman for the State Budget Office, agreed that the laptop giveaway -- formally known as the Freedom to Learn program -- has been successful. But he said the state's continuing budget crisis and a huge cutback in federal funding for the program leaves Governor Granholm little choice.

April 18, 2005

BY MIKE WENDLAND

FREE PRESS COLUMNIST

Detroit Free Press

www.freep.com

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1:1 Initiative Background

- Indiana High School Student Focused
- Core Subject Area Classrooms
- 1:1 Student to Computer Ratio
- Linux Operating System
- Low-cost Desktop Hardware
- Transformed Student Workspace – specially designed desks
- Increases computer time from 35-45 min/week to 6-20 hrs/wk
- Pilots now underway in 24 high schools;   over 100 classrooms; 17000+ Students
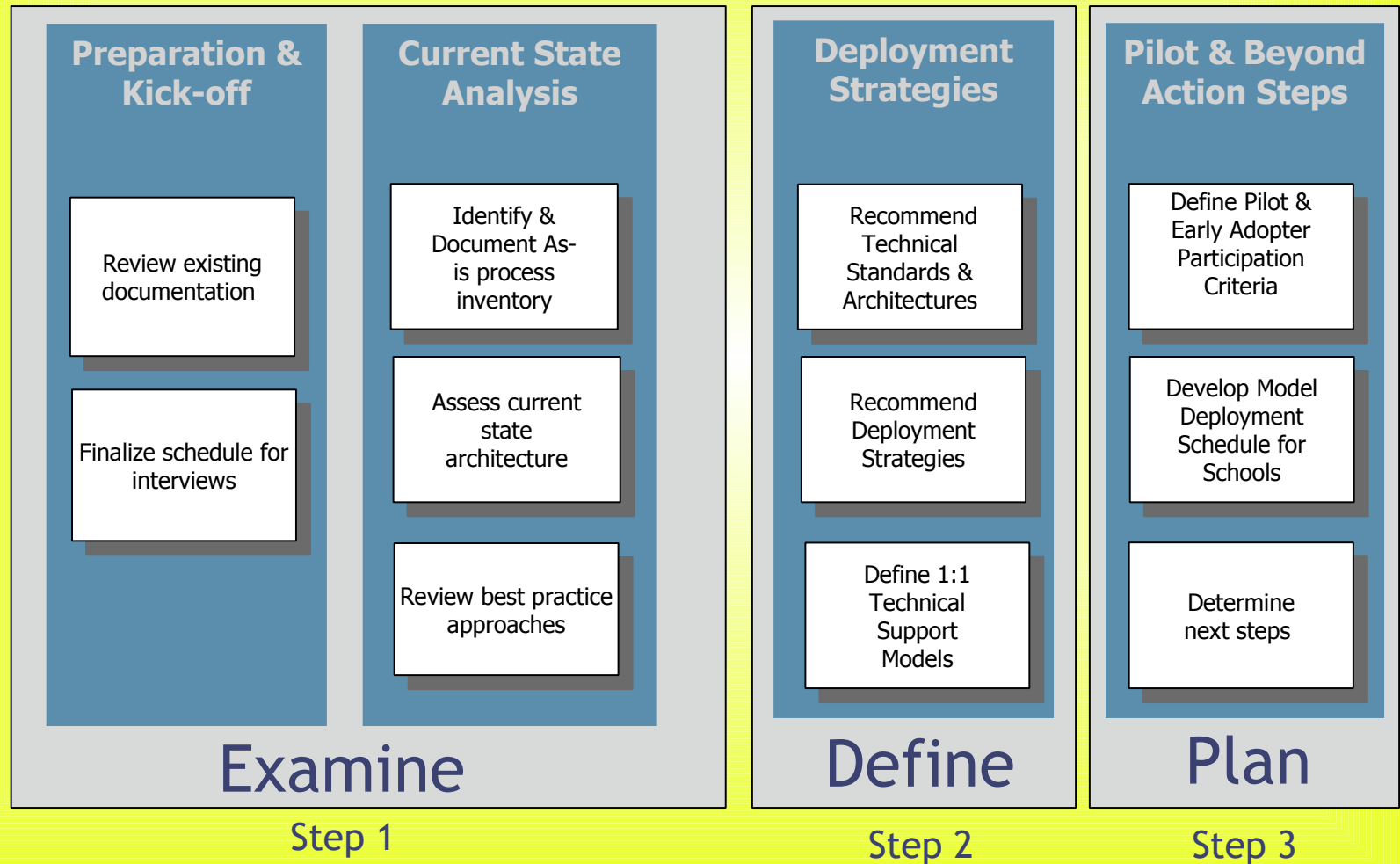- Independent efforts under way in some other schools

Project Background and Goals

1:1 Linux Readiness Assessment Goals

1. Inventory typical applications currently in use; group by application type/characteristics in terms of Linux compatibility
2. Map existing applications/application types to Linux-based applications
3. Summarize hardware migration and re-use options & strategies
4. Recommend future desktop Standard Operating Environment, including future desktop hardware requirements
5. Recommend deployment approach & schedule for the Phase II pilot
6. Recommend deployment approach & schedule for the Phase II pilots
7. Recommend approach for prioritizing districts/schools for participation in Phase II pilots
8. Recommend approach for teacher mixed desktop needs (including Linux and Windows applications)
9. Define back-end / technical support options for schools/districts where Linux desktops are being deployed
10. Recommend software & patch management strategy for deployed Linux desktops or laptops
11. Recommend Linux Desktop deployment communication and change management strategies for typical schools / districts

1:1 Linux Readiness Assessment Approach

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Examine — Step 1

Preparation & Kick-off

- Review existing documentation
- Finalize schedule for interviews

Current State Analysis

- Identify & Document As-is process inventory
- Assess current state architecture
- Review best practice approaches

Define — Step 2

Deployment Strategies

- Recommend Technical Standards & Architectures
- Recommend Deployment Strategies
- Define 1:1 Technical Support Models

Plan — Step 3

Pilot & Beyond Action Steps

- Define Pilot & Early Adopter Participation Criteria
- Develop Model Deployment Schedule for Schools
- Determine next steps

1:1 Readiness Assessment Interviews & Site Visits

Indiana Department of Education

- Suellen Reed
- Phyllis Usher
- Laura Taylor
- Dorothy Winchester
- John Demerly
- Mike Huffman

Legislature

- Rep. Robert Behning
- Sen. David Ford

IHETS

- David King

School Districts & Education Service Centers

- Lance Woods – Southern Indiana Education Center
- Roger Brown – New Harmony
- C.G. Epple – New Harmony
- Dorothy Crenshaw – IPS
- Wayne Hawkins – IPS
- Luther Bowens – IPS
- Geoff McMann – IPS
- David Lovell – IPS

School Districts

- John Jamieson – Shelby Eastern
- Scott Back – Shelby Eastern
- Tim Ragle – Shelby Eastern
- Annette Wilson – Randolph Southern
- Sarah Reed – Randolph Southern
- MSD Decatur – Rob Weisbach

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1:1 Issues & Observations

- Access Control & Security
- Student Internet Use Monitoring
- Technology – Hardware
- Technology – Architecture & Infrastructure
- Technology – Statewide Infrastructure
- Technology – Data Storage & Data Access
- Technology – Application Compatibility
- Technical Support
- Software & Patch Management
- Communications & Change Management

1:1 Issues & Observations – Access Control & Security

- In one school district (not part of an *INDIANA ACCESS* pilot), students obtained access to a generic/shared teacher password. The password (and access to teacher restricted data) was soon being passed around between students in several schools and the students reset passwords for all computers
- Students can view/modify/delete other students' work on local machines at most schools, due to lack of individual identities or authentication
- Some Wireless networks running unsecured, allowing for network sniffing and unauthorized use of network

1:1 Issues & Observations – Access Control & Security (Con't.)

- MAC filtering is in use on some wireless networks in an attempt to provide security. There is significant overhead with such filtering as every packet has to be examined and verified, and such filtering is vulnerable to ARP spoofing
- Widespread use of wireless with DHCP makes it difficult to track malicious behavior or unauthorized use

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1:1 Issues & Observations – Student Internet Usage Monitoring

- Teachers are aware of their responsibility to monitor students' internet usage

- Teachers use monitoring tools to observe what the students are doing on their computers

- All schools have installed internet filters of one kind or another, as mandated by CIPA

- Schools have the ability to periodically monitor network traffic levels

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1:1 Issues & Observations - Technical - Hardware

- Current desktop infrastructure is a mixture of "white-box" systems purchased from Wal-Mart, Wintergreen, systems from Dell,Gateway, Tangent and others, and donated systems from local businesses and individuals
- Laptops in use are a mix of Dell, Apple and others
- Server infrastructure, where present, is from a wide variety of manufacturers, lacking any statewide consistency in design or configuration
- Networking equipment is from a wide variety of manufacturers, typically reflecting the best deal obtainable by a school or district
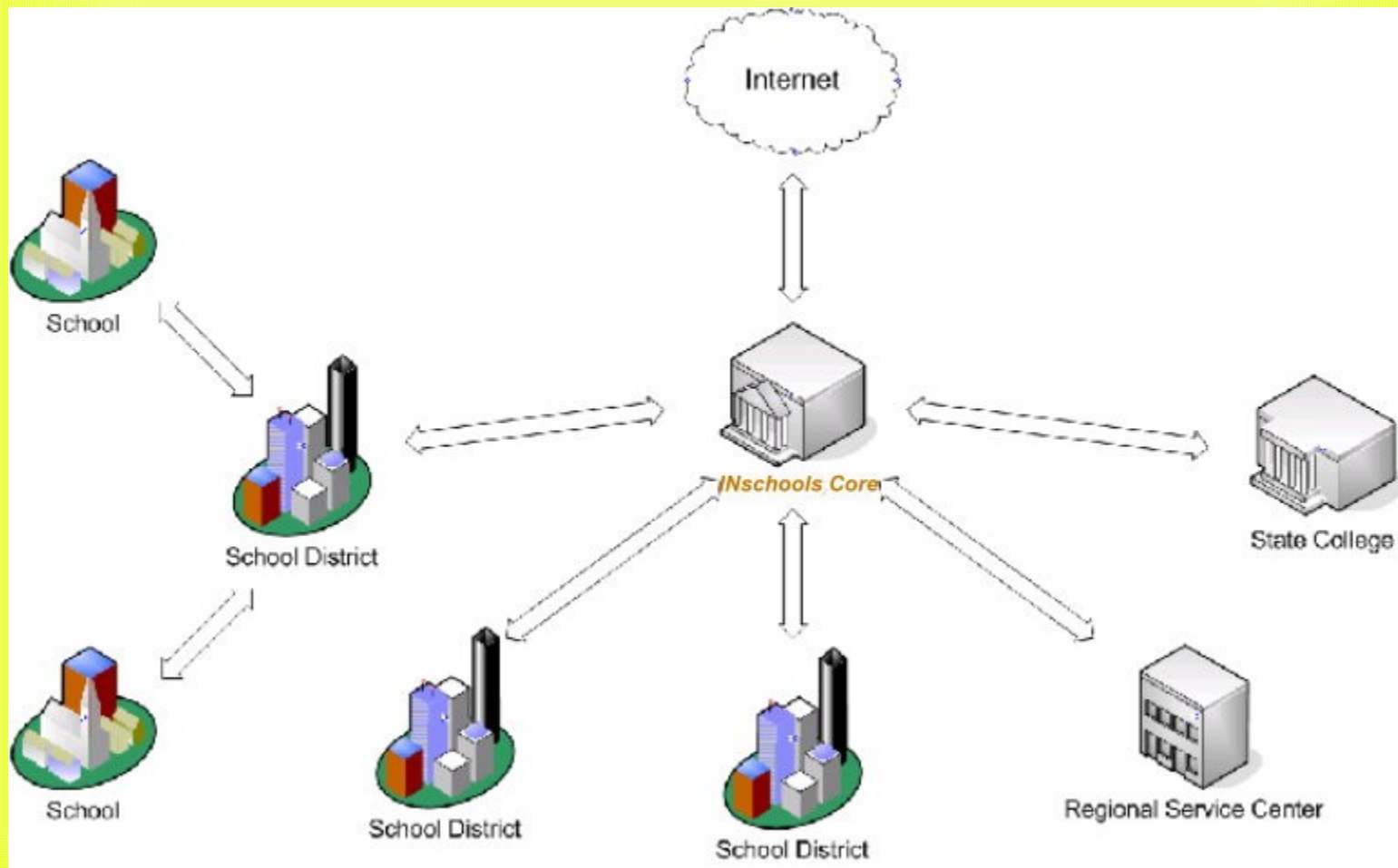
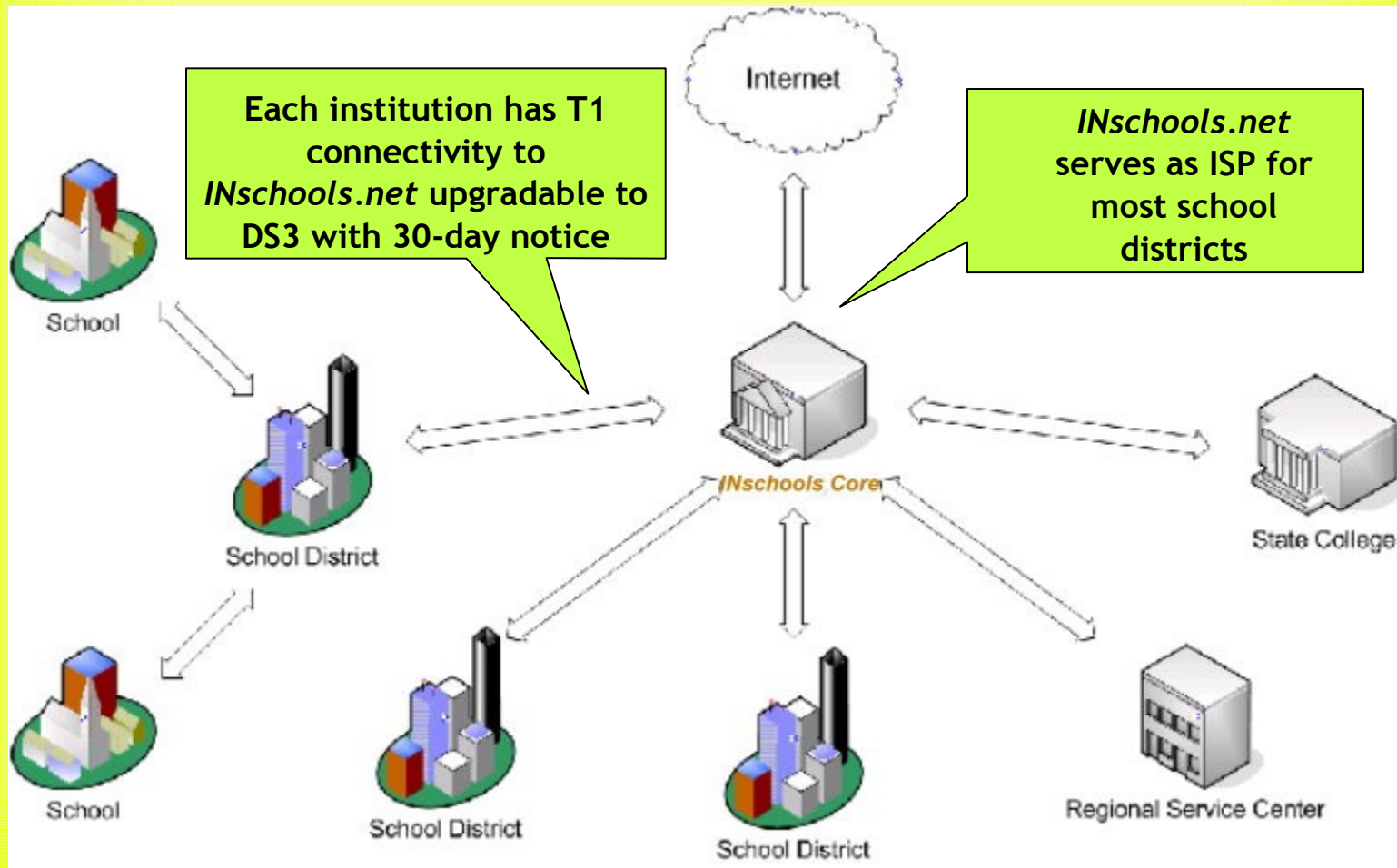# 1:1 Issues & Observations - Technical - Architecture & Infrastructure

- The concept of user accounts is not implemented consistently statewide
- A separate login is typically used to access shared storage at the school level
- Existing school wireless network designs are sub-optimal; e.g., vulnerable to overloading and unexpected outages and/or collapse
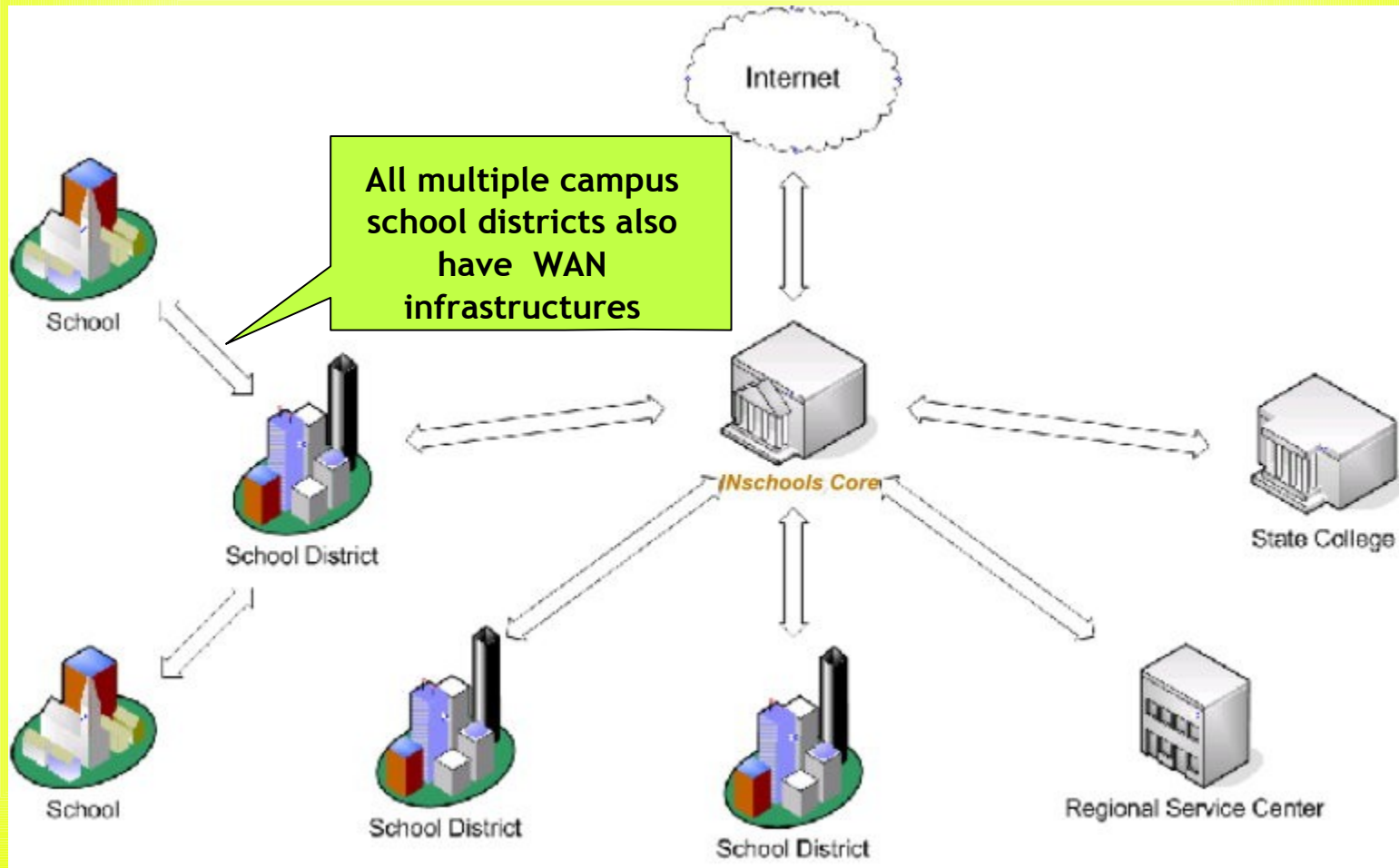- Software updates & reinstalls are man times performed via CD image - initiated one machine at a time

1:1 Issues & Observations – Technical - Statewide Infrastructure

Each institution has T1 connectivity to *INschools.net* upgradable to DS3 with 30-day notice

INschools.net serves as ISP for most school districts

Internet

INschools Core

School

School District

School

School District

School District

State College

Regional Service Center

1:1 Issues & Observations – Technical - Statewide Infrastructure

Current State Architecture – Typical Existing Components Observed in Schools

1:1 Issues & Observations - Technical - Architecture & Infrastructure
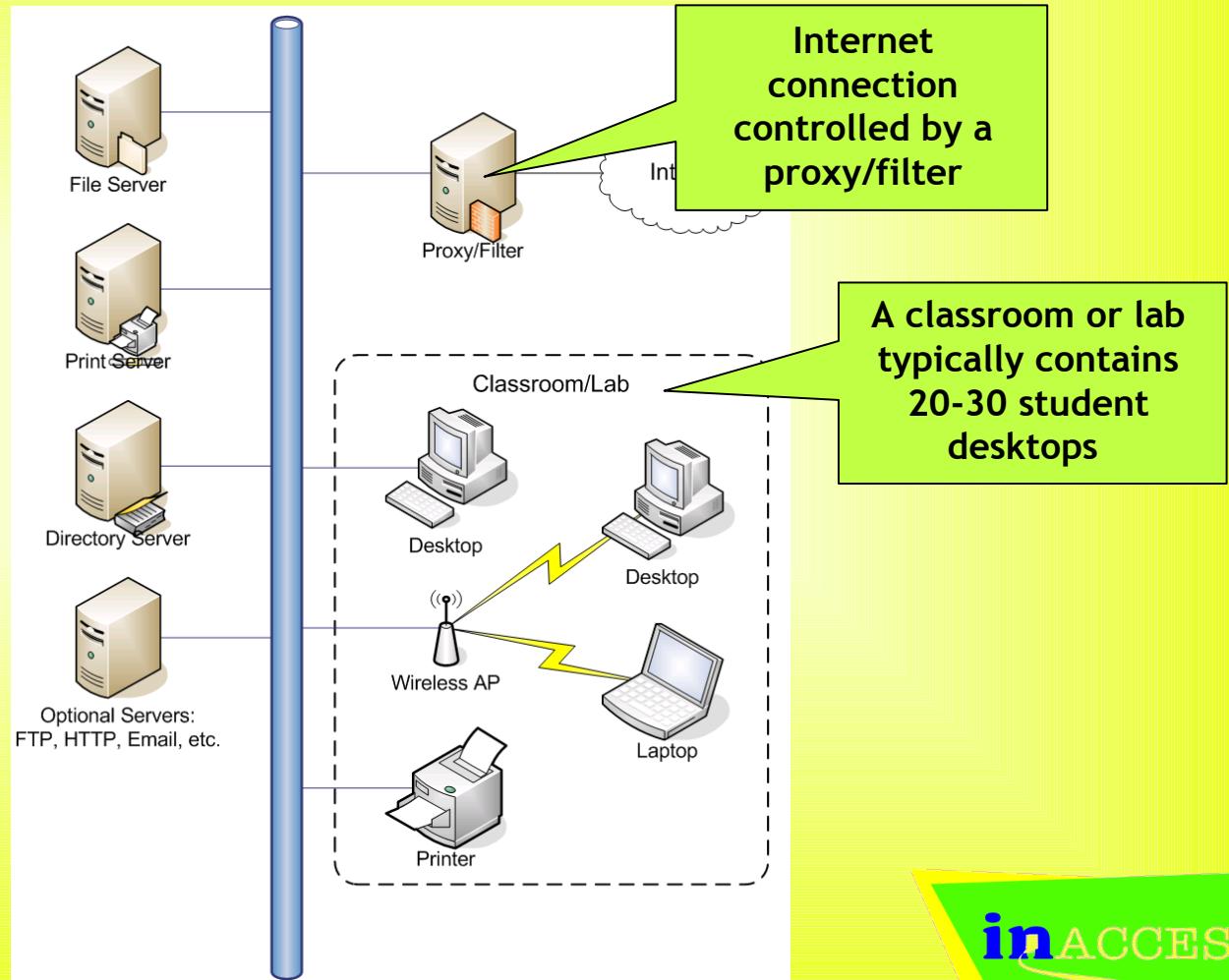
Pros – existing architecture

- Inexpensive to acquire on an ad-hoc basis - "Our custodian did the wiring for our computers."
- Simple to install, thanks to wireless access points

Cons – existing architecture

- Users sometimes log in with a shared user name
- Students need a secondary file storage medium
- There is no provision made for data backup and restoration
- Wireless security issues
  - "Sniffing"
  - Denial of service attacks
  - Unauthorized access
- The existing wireless model may not scale well as the program grows, due to overlapping access points, etc.

Current State Architecture – Typical Existing Components Observed in Schools

Current State Architecture – Typical Existing Components Observed in Schools

A variety of internal and public services

Wireless has been used in some desktop applications

File Server
Print Server
Directory Server
Optional Servers: FTP, HTTP, Email, etc.

Proxy/Filter
Internet

Classroom/Lab
Desktop
Wireless AP
Laptop
Printer

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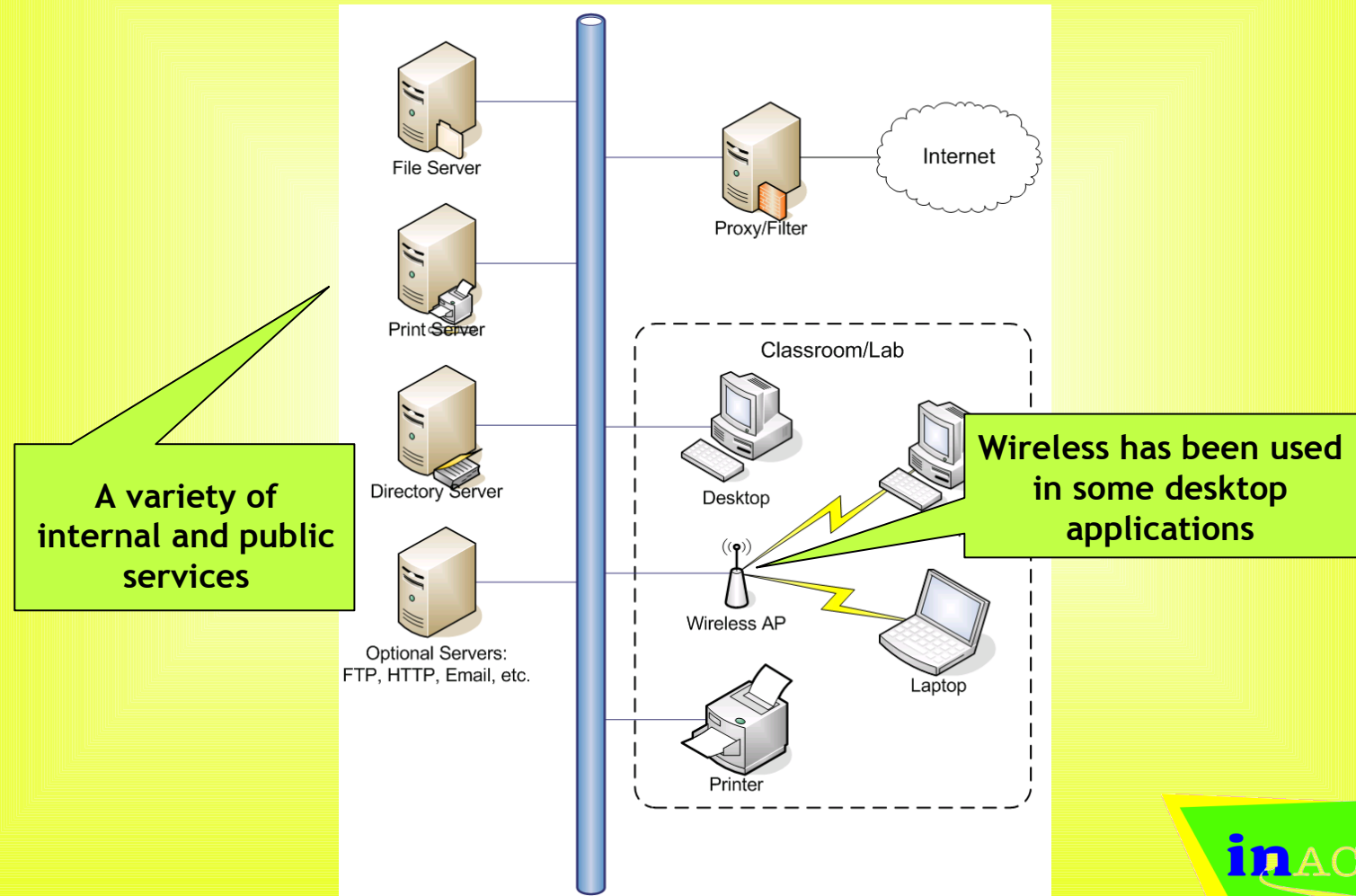
1:1 Issues & Observations
Technical - Architecture & Infrastructure

Workstation Components

- Desktop model
  - Already 1:1 in some classrooms
  - Computer labs used on a task basis
  - Some schools use wireless, others wired
- Laptop model
  - Laptops are issued to students in some schools
  - Laptops are provided on "Computers on Wheels" (COWs) on a task basis in others
- Various operating systems are used within schools
  - Windows
  - Mac OS
  - Linux

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1:1 Issues & Observations
Technical - Architecture & Infrastructure

Infrastructure Components

- The network infrastructure is a local choice
- Various print/file/auth servers deployed
  - NetWare
  - Windows Server
  - eDirectory
  - Active Directory
- Various firewall/proxy solutions used
  - BorderManager
  - SurfControl
  - SonicWall
  - Cisco

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1:1 Issues & Observations – Technical - Data Storage & Data Access

- Students sometimes save their data on whatever machine they happen to be working on, but cannot access it from a different machine

- In some cases, students can connect to a file server after logging in to the computer

- Some schools have purchased flash drives for the students to take home

- Some schools are investigating use of an FTP server for student file access from home

- Student data backup is not adequate, and, in fact, data are sometimes lost whenever a workstation fails or must be re-imaged

- Several thousand students and teachers have signed up for E-Locker, providing up to 50 MB of storage with web-based access from the E-Learning Academy

1:1 Issues & Observations
Technical - Application Compatibility with Linux

- "Textbook CD software is not always compatible with Linux."
- There is a wide variety of applications in use across high schools, but a few that are most common and more important (e.g., Office; Discourse; Criterion)
- Student information systems are most likely to be built on Windows platforms, though there are alternative web-based systems available.
- Some student information systems are available in both Windows- and web-based versions.
- The student info systems used by some schools may dictate the need for dual system access for some teachers.
- Some applications in use are web based, however full compatibility with Firefox/Mozilla will need to be verified

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1:1 Issues & Observations - Technical Support

- Support is handled locally by either a school/district Tech Director, their staff, or via regional Service Center personnel

- Individuals responsible for support are in some cases teachers or individuals with other responsibilities

- There are wide variances in the experience and skill level of support personnel

- Support staff has not been provided with any training related to support of the Linux environment

- There is no consistent, state-wide technical problem resolution / escalation process or issue tracking/reporting procedure

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1:1 Issues & Observations - Technical Support (cont.)

• There is no uniform, statewide implementation of individual tiering or levels of support and/or relevant skill set(1st, 2nd, 3rd, etc.) in current pilot schools for 1:1

•Problem remediation largely consists of completely re-imaging problematic systems, reflecting the commodity nature of the hardware and software.

- Linspire 5.0 is the current Linux distribution in use
- Linspire's Click'n'Run (CNR) is used to push patches and updates to individual systems.
- Linspire has some capability to accomplish distributed patch and software management, though it may not be scalable
- g4l is used for system imaging leveraging an FTP server, however imaging must be manually initiated at each machine, a laborious process
- Multiple tools are currently required to manage updates, patches and imaging

1:1 Issues & Observations Communications & Change Management

- Teachers and principals participating in 1:1 pilots report a need for more education and training in preparation for actual classroom use of computers.
- Teachers participating in pilots indicate that they were unable to quickly/fully integrate 1:1 computers into the curriculum because they had not developed 1:1 strategies and lesson plans
- Buy-in discussions with faculty and parents/students have been very beneficial when held.
- With few exceptions, New Harmony parents and students were willing to accept responsibility for loss or damage to laptop computers and signed waivers to this effect.
- Some teachers are initially less receptive to 1:1 than others.
- Students appear to be almost universally receptive to 1:1. Junior High students are eager to move to 1:1 participation in high school.
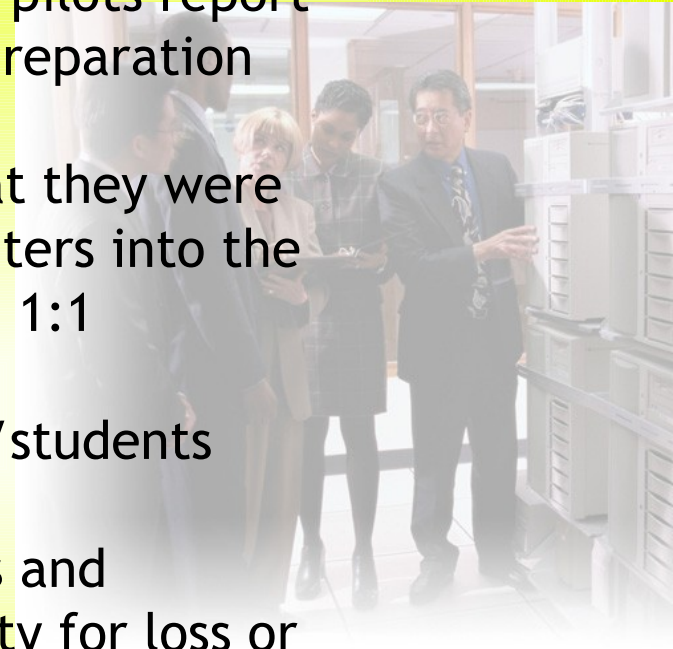
1:1 Issues & Observations
Communications & Change Management (con't.)

- "Our teachers are ready to run with this."
- "The kids are excited; the teachers who are not yet involved want to be involved."
- "Experienced teachers may need more training than the younger teachers" (avg. teacher age is 53 in our school.)
- "How can we get the most out of the new system?"
- "Our teachers would show up for 1:1 training without being paid."
- "It would be good to have the summer to set up the system."
- "Our English department has used the computers the most."
- "We need 1:1 for end of course assessments and for standardized testing."
- "We felt rushed to get ready for 1:1 and could have benefited from more preparation time."
- "The 1:1 initiative needs to be clearly tied to curriculum and instructional objectives"

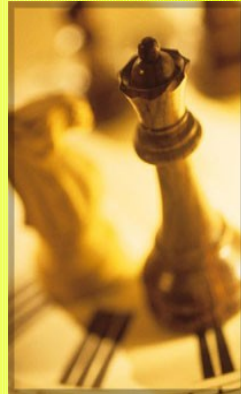# 1:1 Issues & Observations – Comments from Indiana Elected Officials

- "The mind set of superintendents and administrators is to save dollars."
- "Curriculum and educational standards are vital."
- "The dollars we have spent on technology thus far have not resulted in better test scores for students."
- "We need more data on what works and what doesn't."
- "Students progress faster when they can study at their own pace."
- "Bandwidth is an issue at some schools."
- "Many teachers are not comfortable with technology."
- "We need buy-in at multiple levels to make this work."
- "We can only do what we can afford."
- "Teachers need access to computers and software."
- "We need to focus on building the architecture that will give us the capability and capacity to sustain 1:1 computing long term."
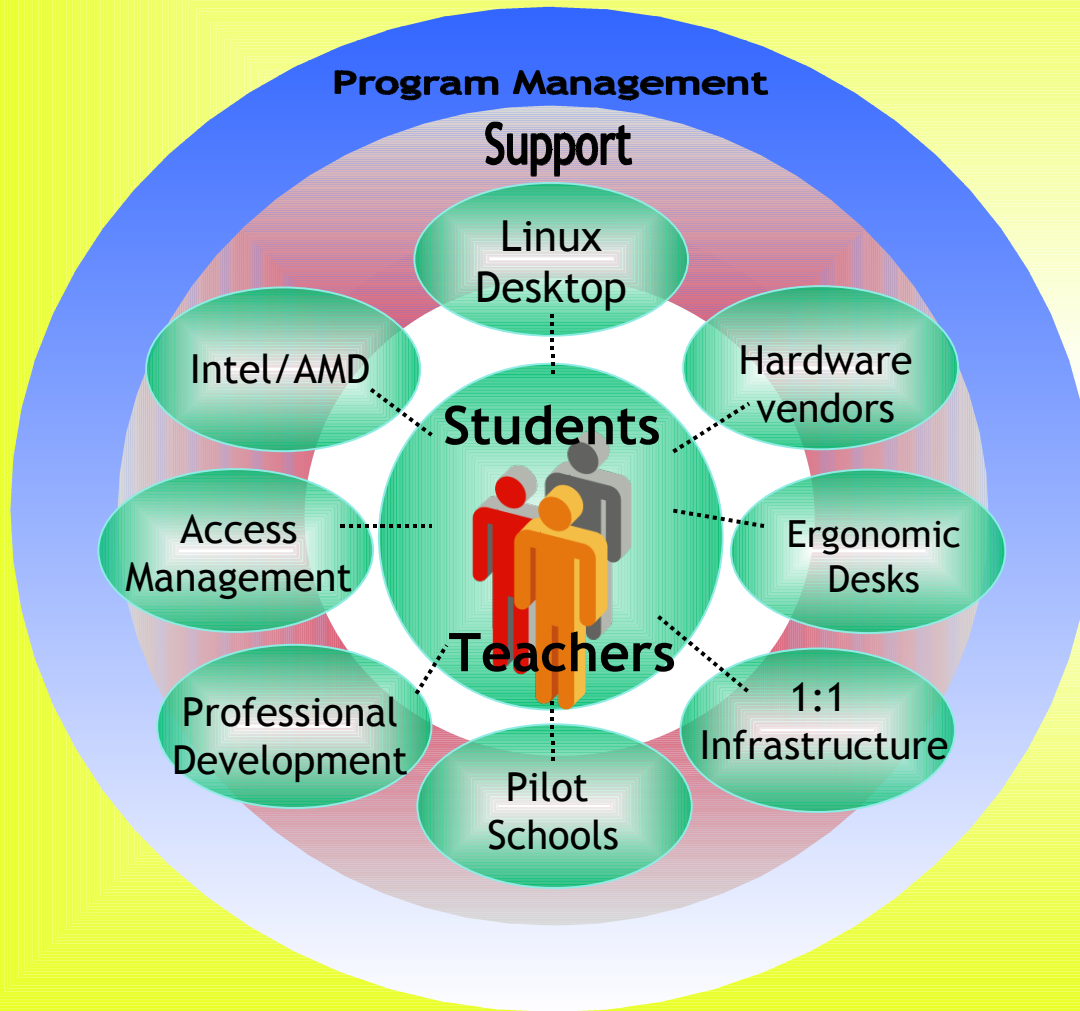- "We need the network bandwidth to support heavy simultaneous use of computers in schools."

1:1 Guiding Principles & Value Model

1:1 in Indiana – Eight Guiding Principles

- **Affordability** – highly economical, low cost/low investment model – (initial per student cost in the $500-600 range; replacement cost in the $200-300 range)
- **Sustainability** - for participating high schools – minimal need for ongoing investment or reinvestment
- **Repeatability** – 1:1 model is replicable in any typical high school
- **Flexibility** - deployment is adaptable to both wireless or wired; new or older schools; small or large schools
- **Openness** - "Linux" operating system and other open source software (e.g., OpenOffice/StarOffice) minimize software costs
- **Compatibility –** supports and enables future direction of Indiana education initiatives (e.g., on-line testing; end of course assessments; technology skills)
- **Commonality** – solution designed with "common denominator" elements readily accessible to participating schools
- **Scalability** – the 1:1 technical deployment model scales reliably to 300,000+ simultaneous student & teacher users

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The 1:1 Model & Pilot Phase Ecosystem

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Program Management

Support

Linux Desktop

Intel/AMD

Hardware vendors

Students

Access Management

Ergonomic Desks

Professional Development

Teachers

1:1 Infrastructure

Pilot Schools

- **Affordability as a guiding principle**

- **Student performance as a goal**

- **Linux as a cornerstone**

- **Open Source as a direction**

- **Program management and support as success factors**

Participation in the 1:1 initiative is designed to create observable change among students

Short Term
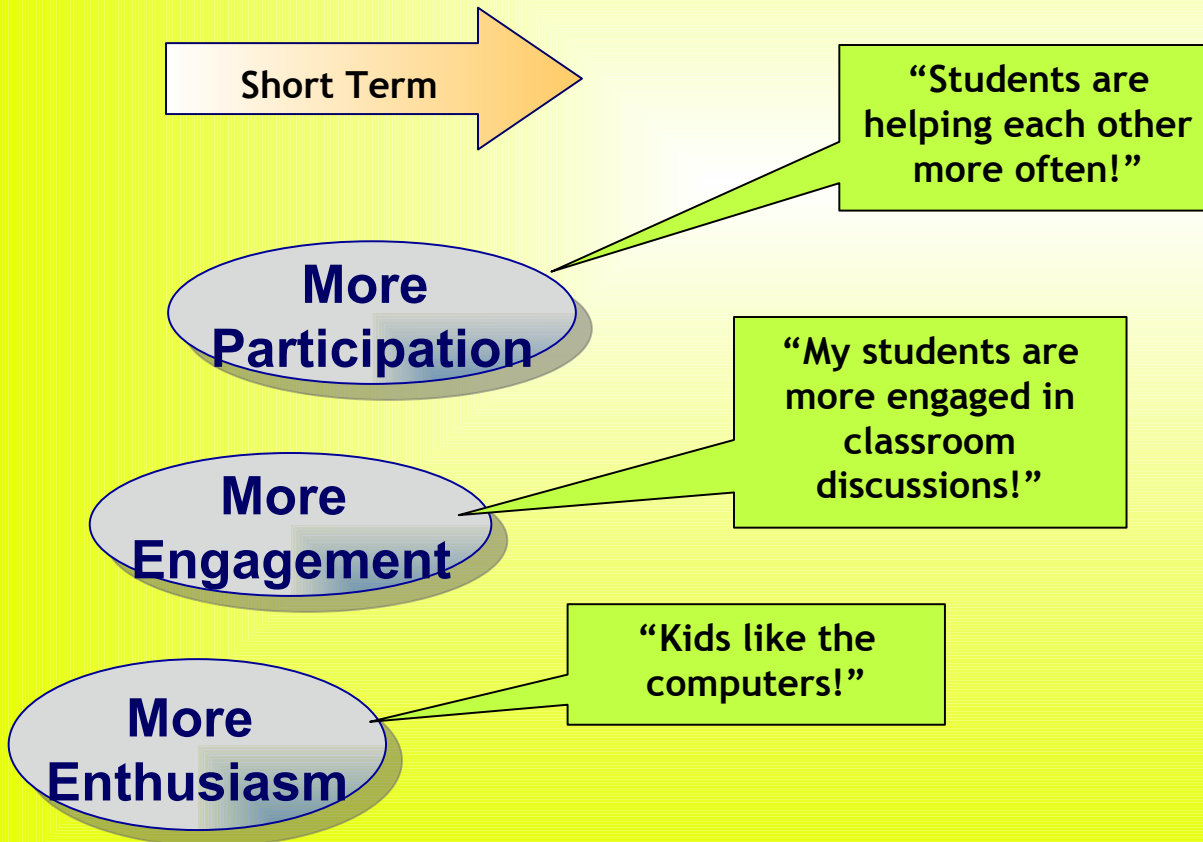
More Participation

More Engagement

More Enthusiasm

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Participation in the 1:1 initiative is designed to create observable change among students

Short Term

More Participation

"Students are helping each other more often!"

More Engagement

"My students are more engaged in classroom discussions!"

More Enthusiasm

"Kids like the computers!"

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Participation in the 1:1 initiative is designed to create observable change among students

Medium Term →

Short Term →

Improved Confidence

More Participation

More Peer Feedback

More Engagement

More Rigor
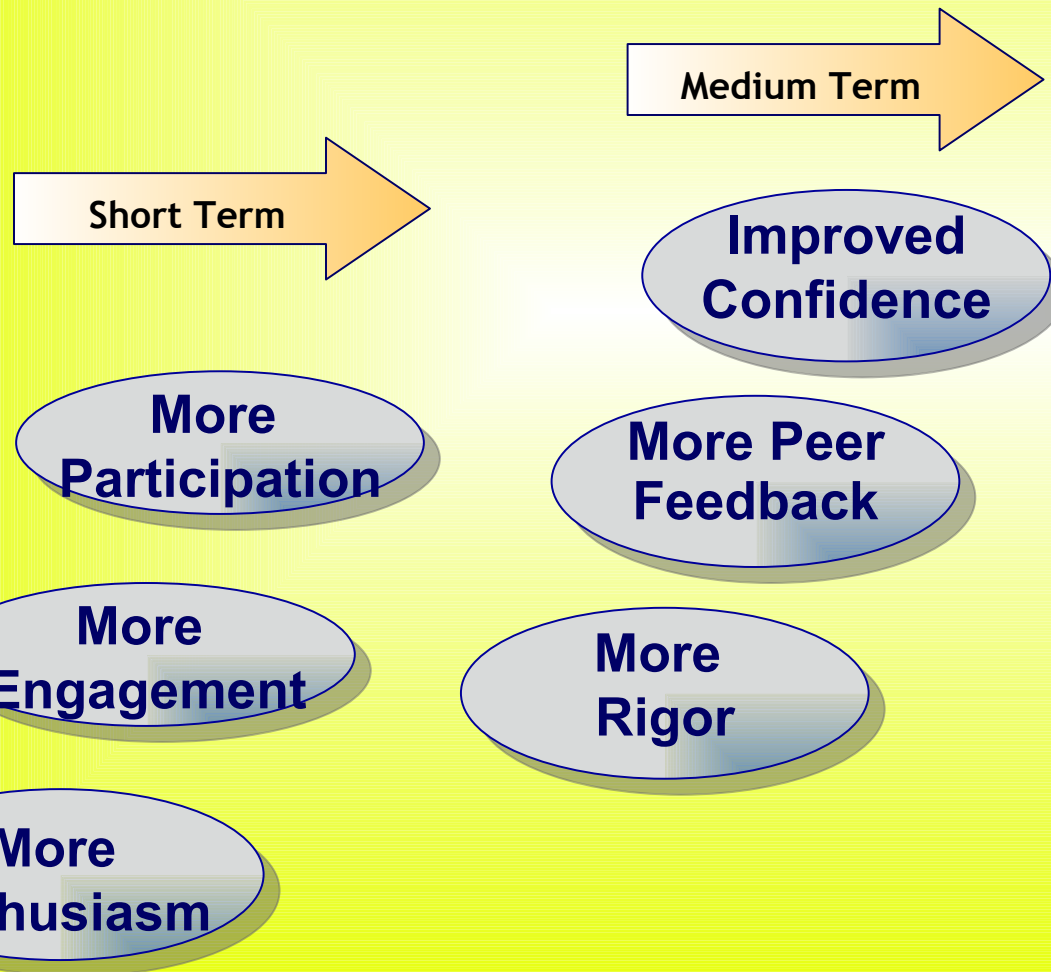
More Enthusiasm

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Participation in the 1:1 initiative is designed to create observable change among students

Medium Term →

Short Term →

Improved Confidence

More Participation

More Peer Feedback

"My Students are able to do peer editing now – rarely done before 1:1"

More Engagement

More Rigor

"Students are taking better notes – and I can actually read them"

More Enthusiasm

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The true value of participation in the 1:1 computer initiative is observable change in student behavior

Short Term

Medium Term

Longer Term

Improving Test Scores

Improved Confidence

More Participation

More Peer Feedback

Improving Knowledge

More Engagement

More Rigor

Improving Skills

More Enthusiasm

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The true value of participation in the 1:1 computer initiative is observable change in student behavior

Longer Term →

Medium Term →

Short Term →

"My students have retained more information about American Literature."

Improving Test Scores

Improving Knowledge

More Participation

More Engagement

"Students used to write 1-2 papers per 9 wks. – Now they write every day!"

Improving Skills

More Enthusiasm

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1:1 Technical Architecture Recommendations

Recommended 1:1 Architecture Direction

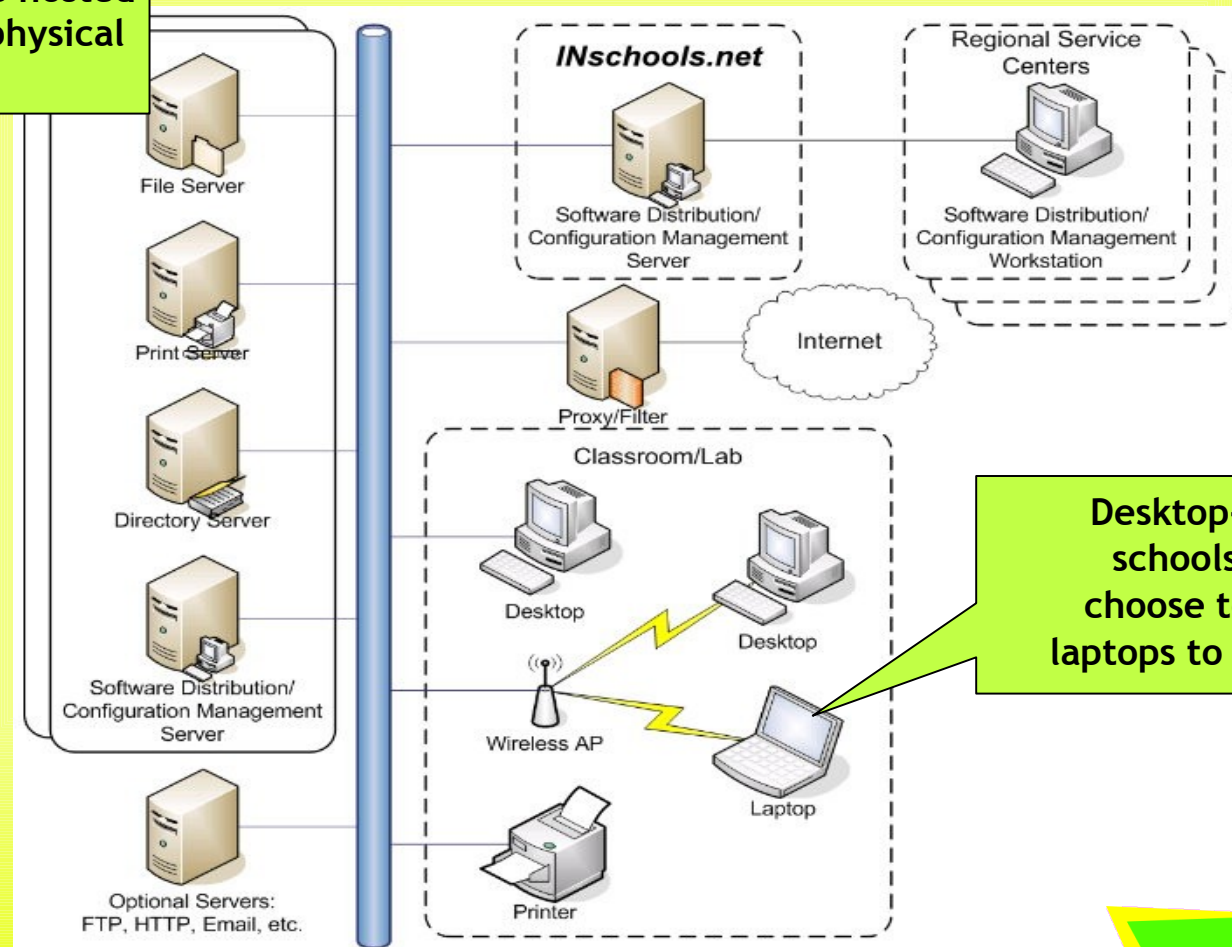A 1:1 architectural strategy evolving from….

1. Current state – ad-hoc type architecture, to..
2. Proactively designed "common denominator" Reference Architecture to enable successful, relatively secure 1:1 deployment, to …
3. Eventual, more secure and scalable reference architecture for longer-term success and enhanced security using identity-driven computing concepts
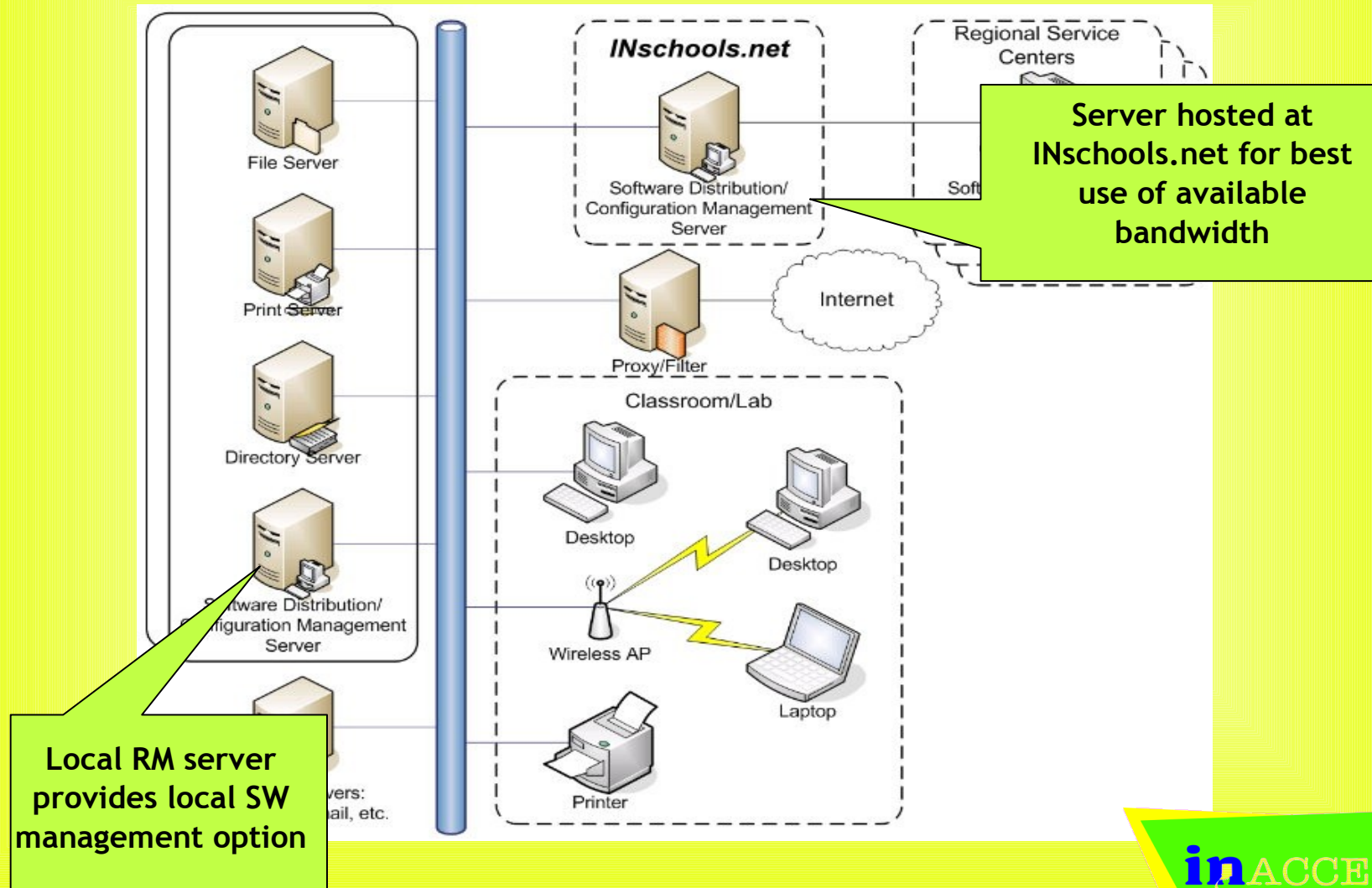
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Recommended 1:1 Conceptual Architecture
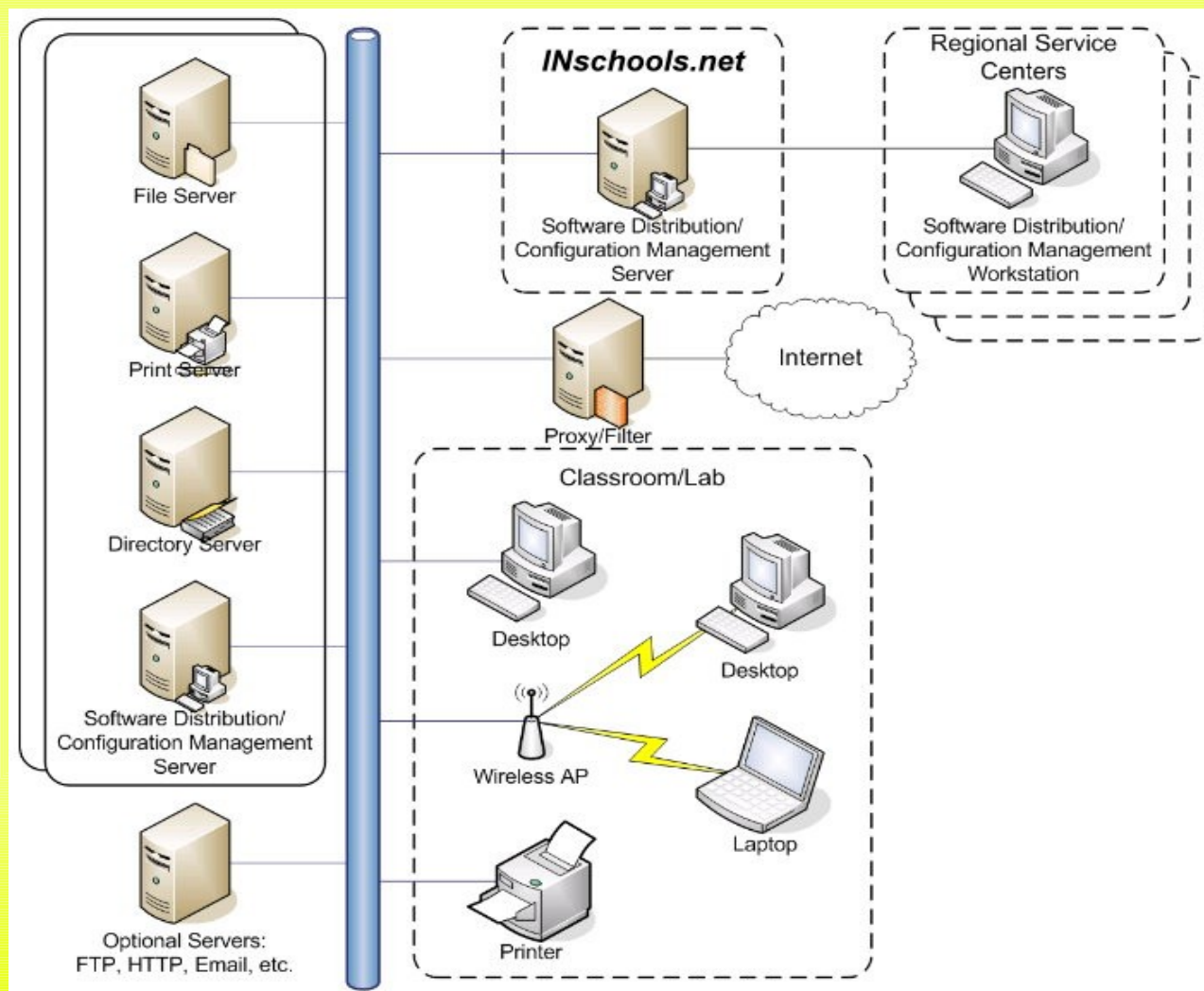
Recommended 1:1 Conceptual Architecture

Services may be hosted on redundant physical servers

File Server

Print Server

Directory Server

Software Distribution/ Configuration Management Server

Optional Servers: FTP, HTTP, Email, etc.

INschools.net

Software Distribution/ Configuration Management Server

Regional Service Centers

Software Distribution/ Configuration Management Workstation

Internet

Proxy/Filter

Classroom/Lab

Desktop

Desktop

Wireless AP

Laptop

Printer

Desktop-based schools may choose to issue laptops to teachers

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Recommended 1:1 Conceptual Architecture

Server hosted at INschools.net for best use of available bandwidth

Local RM server provides local SW management option

Recommended 1:1 Conceptual Architecture

Remote management from service center or school corporation

Recommended 1:1 Conceptual Architecture

Components:

- Each school has centralized file server(s)
- Each school has centralized authorization server(s)
- ZenWorks Linux Management server(s) is used for software distribution and configuration management
- An ethernet switching infrastructure or wireless access points may be used
- A firewall/caching proxy server is recommended at each school, content filtering is mandated
- A caching proxy is recommended upstream at *INschools.net*
- Schools may be using desktops, laptops, handhelds or a combination of all

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Recommended 1:1 Conceptual Architecture

Attributes:

- Individual user accounts, provisioned at the school level
- Applications are installed on the local disk
- User data are stored on central server
- Desktops use wired network; laptops use wireless
- Special purpose machines may be designated
    - A dedicated classroom server (HTTP, specialized applications)
    - Teachers may be issued a laptop
    - Architecture allows the teacher to have an additional Windows system for specialized applications (KVM switch)

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Recommended 1:1 Conceptual Architecture

Architecture Attributes:

- Data may be accessed from any network-connected machine

- Security is improved due to authentication

- Data backup/recovery is possible due to central file storage

- Patch management is simplified due to centralized distribution (with some additional components necessary)

- Slightly higher cost to acquire than current state, offset by significant time savings due to automated patch management and software distribution capability

- Wireless issues can be mitigated using this architecture

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Recommended Data Storage & Data Access Infrastructure

Students need persistent storage as they move between 1:1 computers

- Individual schools should implement file synchronization with either iFolder or rsync
- File servers located at each school should be backed up regularly, since failure of individuals to back up files is common

Application Strategy Recommendations

Application Compatibility Segmentation

Each application to be migrated must be examined to determine its suitability for Linux. Applications fall into seven broad categories with respect to platform compatibility:

- Runs on Linux
- Requires Wine or Crossover
- Requires Terminal Services
- Web-based - Mozilla/Firefox/Netscape Compatible
- Web-based - Requires Microsoft Windows or Internet Explorer
  - Reasons may include ActiveX controls, specific Java versions
- Retire or Discontinue
- Replace

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Application User Segmentation

• Applications may also be categorized with respect to user group. In this view, the categories are:

- General Purpose/Productivity
- Educational/Curriculum
  - These can be further broken down by subject area (e.g., English; Biology; Math; Social Studies, etc.)
- Educational/Administrative (e.g., Student Information Systems)

• Priority should be given to migrating those applications with the largest user groups.

• The more specialized the application, the lower the likelihood of finding a Linux-compatible equivalent.

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Thick Client Applications

• Thick client web applications merit special mention. Many of these consist of server and client components written in .NET, Microsoft's development framework. These applications will currently only run on Windows.

• Novell sponsors the Mono Project, an open source implementation of the ECMA standards behind .NET.   Mono allows you to run .NET applications on Linux and Mac OS X, as well as Windows.

• Novell will work with ISVs to certify their .NET applications on Mono.

• Novell will cooperate with DOE and Indiana school districts to encourage education software suppliers (ISV's) to certify their software to run on Linux computers and/or achieve compatibility with the Open Source web browser Firefox.

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1:1 Key Applications Analysis

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	Application	Runs on Linux	Web-Based Netscape or Firefox Compatible	Linux Being Tested	Requires Wine or Crossover	Requires Terminal Svcs.	Web-Based IE or Windows Only	Retire or Discontinue	Replace	
1	CompassLearning		✓							
2	Edline		✓							
3	PowerSchool		✓							
4	Plato		✓							
5	SkillsTutor		✓							
6	Discourse		✓							
7	Criterion		✓							
8	Pearsons(TBD)			✓						
9	Star Office	✓								
10	Dyknow			✓			✓			
11	SDS		✓							
12	MS Office							✓		
13	MS Outlook / Express							✓		
14	Wondows Media Player				✓	✓				
15	Firefox	✓								
16	Open Office	✓								
17	NWEA(TBD)			✓						
18	Shockwave				✓					

Core inACCESS Open Source Components

StarOffice 8

- Substantial usability improvements
- Enhanced handling of MS Word, Excel files

- SAP support
- Improved OO 2.0 release imminent

Mozilla

- Compatibility with many IE-specific web sites
- 14% browser market share and growing rapidly

- Broad corporate sponsors: AOL, IBM, Sun, Google, Novell

Novell Evolution

- Minimal retraining for Outlook users
- GroupWise support out of the box

- Microsoft Exchange server support
- PocketPC/bluetooth synchronization

Linux Kernel

- Laptop support (ACPI)
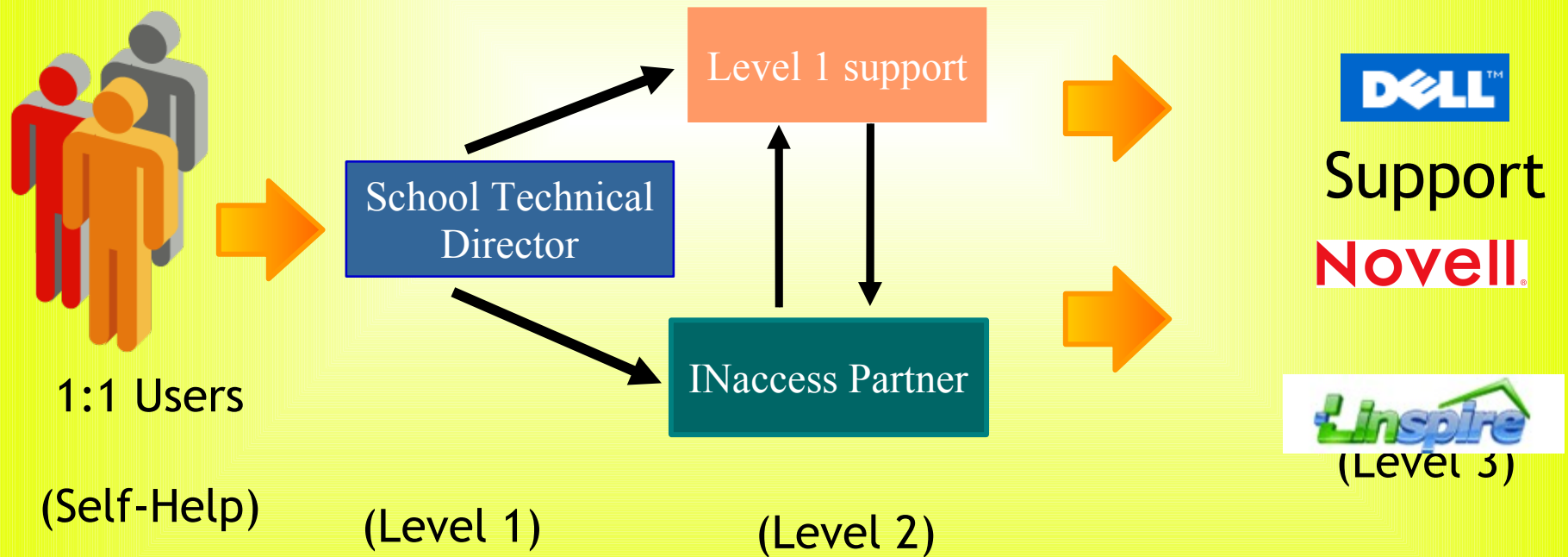- Improved plug and play
- Biometric/smart card devices

- Better performance for desktop users

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Support Model Options & Recommendations

1:1 Recommended Hardware & Software Support Model for Schools

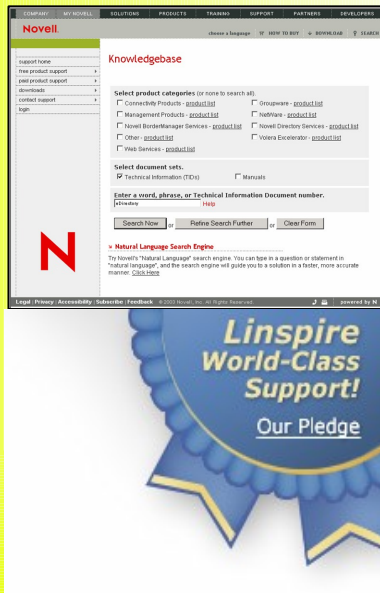
1:1 Users

(Self-Help)   (Level 1)   (Level 2)

Linux Self-help Support Tools

Powerful tools & advanced resources

- Novell/Linspire Support Resource Library
- Novell Product Toolkits
- Novell Software Evaluation and Development Libraries
- Novell Professional Resource Suite
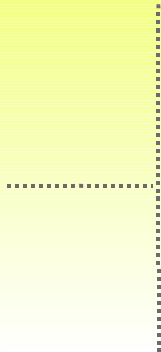- Linspire Knowledgebase

Online support options

- Knowledgebase & support forums
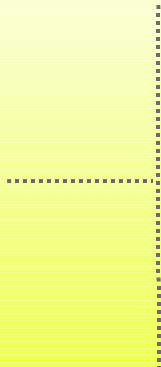- Patches, fixes, tips & tricks
- CNR
- Documentation

http://support.novell.com
http://support.linspire.com/

Linux Self-help Tools for NLD Users

Quick Start Cards for Novell Linux Desktop
Topics covered include:
- Panels
- Workspaces
- File Management
- Archives
- Desktop Settings
- FireFox Web Browser

Quick Start Cards for OpenOffice
Topics covered include:
- Formatting your Document
- Productivity and Navigation Shortcuts
- Headers and Footers
- Tables
- Graphics
- Charts and Graphs
- Recording Changes

http://support.novell.com

1:1 Support Model Recommendations

General

- **Create per-school support workflow based on available support elements (i.e., use or non-use of service centers, INaccess partners, etc.) including responsible parties for support of any application(s) or hardware not provided as, or supported as a component of certified hardware/software platform/architecture**

- **Establish overall training curriculum for individuals responsible for supporting environment based on role and level of involvement/responsibility**

- **Provide access to Novell/Linspire Self-help/learning resources**

- **Create troubleshooting guide based on defined hardware/software architecture**

- **Establish problem remediation processes and reporting mechanism**

- **Define metrics for determining utilization levels of support staff**

- **Establish "Community of Practice" mailing list/archive for support staff state-wide**

- **Provide for the support incident statistics to be fed back into the planning process**

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1:1 Support Model Recommendations (cont.)

Teachers
- Provide training on support processes and contact list for support staff
- Provide usage guides/"cheat sheets" for commonly used applications

School / District Tech Directors and Staff
- Provide information on support processes and contact list for support staff
- Offer/coordinate training and/or certification in NLD and supporting infrastructure technology (e.g., SLES, and ZLM) Note: Novell Linux Desktop online training is free to users through March 2006. http://www.novell.com/training/train_product/lcm/lcm.html

Education Service Center Staff
- Enable a service center technical resource to coordinate and provide support for 1:1 schools in the center's geography
- Offer/coordinate training and/or certification in NLD and Linspire, and supporting infrastructure technology (e.g., SLES, and ZLM)

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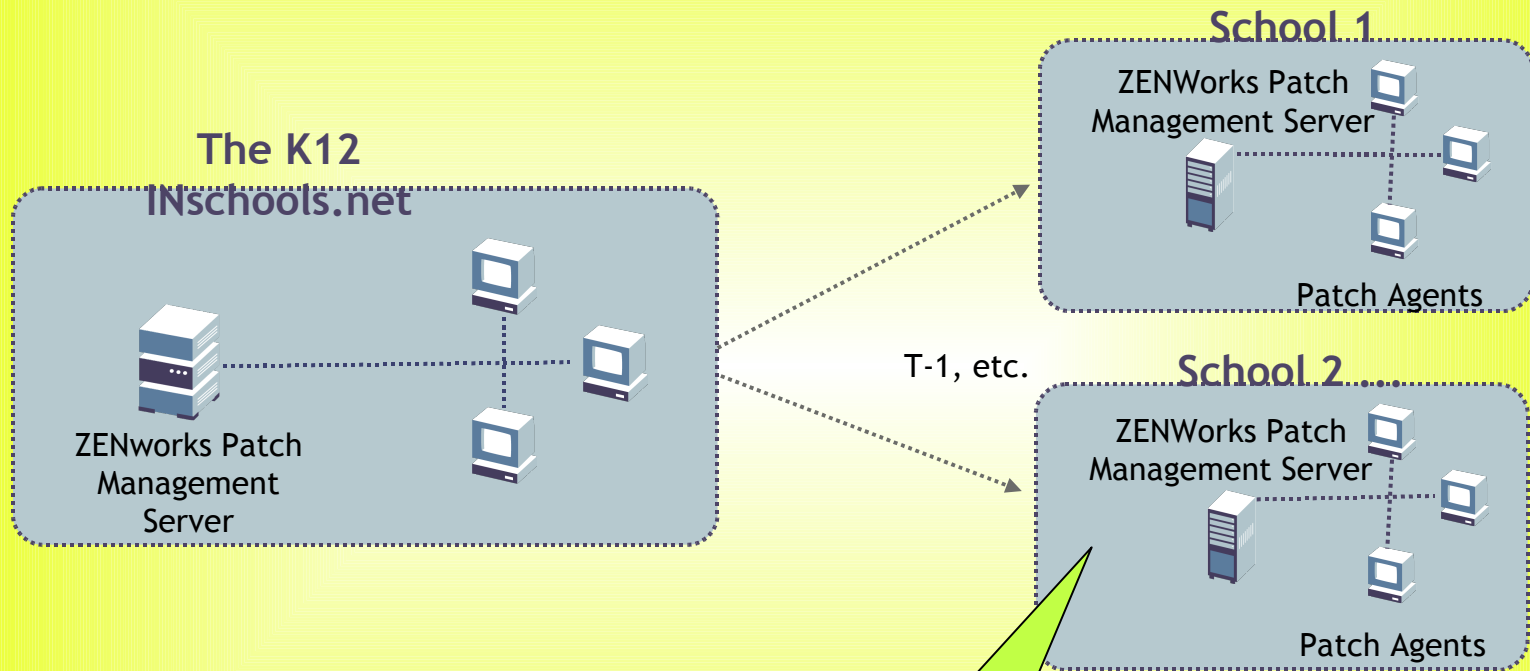# Gold Master Software & Remote Management Recommendations

1:1 Gold Master Recommendations for NLD Implementation (Same basic model to be followed with Linspire and others)

- The Phase I gold master image will contain the following components:
  - NLD 9 SP1, including the Gnome and KDE desktops, OpenOffice, Mozilla, Firefox, Adobe Reader, Flash Player, The Gimp (image manipulation program), Evolution (email client), Gaim (instant messaging client), Gphoto (photo catalog), Gstreamer (streaming media player), and more
  - Other separately licensed applications, including StarOffice, Crossover, Shockwave, and specialized education applications
- Phase II and later gold masters will include NLD 9 (SP2), NLD 10, etc., as available
- Existing installations will automatically be updated to the latest gold master

1:1 Master Image Update Recommendations

•The state K-12 network data center will be used to host the Master ZLM server.

•Each school will also host a ZLM server.

•Using Tiered Electronic Distribution, the Master ZLM server will distribute patches and new applications to the school.

•The local ZLM server will be administered remotely by school corporations and regional educational service centers.

•Individual schools and service centers can create their own channels to add additional applications as needed.

•DOE is working with Linspire to host a central CNR server

ZENworks 6.5 Patch Management Deployments

Preferred Deployment Method

- Group Deployments

  - Never deploy patches & updates to user groups without testing & deployment planning

- Deployment Scenario

  - Receive Notification of new Package

  - Check to see if it is a package you want to deploy

  - Deploy to test computer

  - Deploy to test group (real users)

  - Deploy to distribution groups / Add to Mandatory Base Line

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Security & Identity Recommendations

Student Internet Usage Monitoring Recommendations

Teachers should have the ability to use VNC to monitor individual student workstations

- Make sure the students are on task with their computer usage
- Provide assistance with student work assignments without leaving the teacher's desk

Schools currently use CIPA compliant internet filters to prevent access to inappropriate web content (Children's Internet Protection Act)

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Recommended 1:1 Access Management Infrastructure

Access Management "Lite" Strategy & Architecture is recommended for the short- to medium-term future

- Each school maintains a directory server
- Each student and teacher has a unique, permanent identity within a school (this already exists in Indiana schools)
  - Teachers' ids are provisioned upon hire
  - Students' ids are provisioned upon registration
- Each student and teacher is authenticated to the school's directory when logging in to any computer in the school
- Each student and teacher is automatically provided with access to his or her data store when logged in to any computer in the school
- Each student or teacher is authorized for internet access when logged in to any computer in the school
- Each access of any school resource is system logged

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Recommended 1:1 Access Management Infrastructure

Access Management "Lite" is not complex

- Access Management Lite is used *only* for authentication, file access, email, and internet access
- Access Management Lite does not follow students between different schools

However…

- Access Management Lite is a an important step on the way to a more secure computing environment

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Communications & Change Management Recommendations

1:1 Communications & Change Management Recommendations

Teachers

- Teachers will need time prior to their school's "go-live" date to become comfortable with the new hardware and Linux software. It is recommended that schools hold teacher 1:1/Linux orientation at the time classroom hardware is installed.
- Teachers should be allowed to take their CPU or laptop home with them for learning purposes during the summer or weeks preceding computer deployment in their schools.
- Teachers should be provided with sample/example lesson plans that illustrate "best practice" in integrating the 1:1 computer environment with the English, Biology, Social Studies, etc. curricula they will be teaching.

Parents

- Schools should hold a joint orientation session for students and parents to explain/demonstrate the 1:1 concept and outline the goals, policies, responsibility/accountability, timing, etc. associated with participation
- Where possible, incorporate concepts like the "Homework Hotline" into parent briefings

Students

- Provide an orientation session for students and their parents to explain/demonstrate the 1:1 concept and outline goals, policies, responsibility/accountability, timing, associated with participation

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1:1 Communications & Change Management Recommendations

Education Service Center Staff

- Enable a service center technical resource to coordinate and provide support for 1:1 schools in the center's geography
- Offer/coordinate training and/or certification in NLD and supporting infrastructure technology (e.g., ZLM)

School / District Tech Directors

- Offer/coordinate training and/or certification in NLD and supporting infrastructure technology (e.g. ZLM) Need to understand their role in the deployment process
- Discuss their possible role in the support process – (Level II support)

Department of Education

- Appoint a DOE level Program Manager to coordinate 1:1 pilots and subsequent deployment
- Determine metrics for monitoring/measuring student behavior and academic improvement as a result of 1:1 participation. Metrics might include pre- & post 1:1 changes in factors such as:
  - Attendance; Quiz scores; Criterion feedback; Test Scores; End of Course Assessments, etc.
- Develop and distribute project-based examples of lesson plans leveraging 1:1 teaching models to all current and prospective 1:1 teachers in the appropriate subject areas

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1:1 Phase II Program Timeline

Major Tasks:

- Create program management function
- Select pilot schools for Phase II
- Notify partners of upcoming orders
- Identify local champions, technical leads
- Survey sites; determine appropriate infrastructure needs
- Identify support options
- Identify orientation & self-help options for teachers
- Build out IHETS ZLM servers
- Schedule pilot rollouts

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1:1 Phase II Project Timeline

Major Tasks:

- Order equipment
- Schedule teacher orientation/training
- Schedule Technical Director orientation/training
- Prepare classroom infrastructure
- Install equipment
- Test equipment
- Plan Student/Parent orientation

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Questions?